



PCI-SIG ENGINEERING CHANGE NOTICE

TITLE:	Define new smaller form factor
DATE:	March 16, 2006
AFFECTED DOCUMENT:	PCI Express Mini Card
SPONSOR:	Ron Shaw, Dell, Inc.

Part I

- 5 1. Summary of the Functional Changes
 - Defines a smaller form factor, Half-Mini Card, utilizing the same connector and keep outs as the original Mini Card, now call the Full-Mini Card.
2. Benefits as a Result of the Changes
 - This new smaller form factor will allow additional add-in cards for additional BTO options.
- 10 3. Assessment of the Impact
 - No impact to the current Mini-CEM form factor requirements.
4. Analysis of the Hardware Implications
 - No changes to current Mini-CEM form factor hardware.
5. Analysis of the Software Implications
- 15 • None known at this time.

Part II

Detailed Description of the change

2. Mechanical Specification

2.1. Overview

5 This specification defines two small form factor cards for systems in which a PCI Express add-in
card cannot be used due to mechanical system design constraints. The specification defines smaller
cards based on a single 52-pin card-edge type connector for system interfaces. The specification
also defines the PCI Express Mini Card system board connector. In this document *Mini Card* refers
10 to either form-factor. As the two form-factors primarily differ in length, they will be individually
identified as the *Full-Mini Card* and *Half-Mini Card* for the full length and half-length versions of the
cards, respectively.

Deleted: a

Deleted: a

Formatted: Font: Italic

Formatted: Font: Italic

Formatted: Font: Italic

2.2. Card Specifications

There are two PCI Express Mini Card add-in card sizes, Full-Mini Card and Half-Mini Card.

Deleted: is

Deleted: one

For purposes of the drawings in this specification, the following notes apply:

- 15 ☐ All dimensions are in millimeters, unless otherwise specified.
- ☐ All dimension tolerances are ± 0.15 mm, unless otherwise specified.
- ☐ Dimensions marked with an asterisk (*) are overall envelope dimensions and include space allowances for insulation to comply with regulatory and safety requirements.
- ☐ Insulating material shall not interfere with or obstruct mounting holes or grounding pads.

2.2.1. Card Form Factor

The card form factors are specified by Figure 2-1 and Figure 2-2. These figures illustrate example applications. The hatched area shown in this figure represents the available component volume for the card's circuitry.

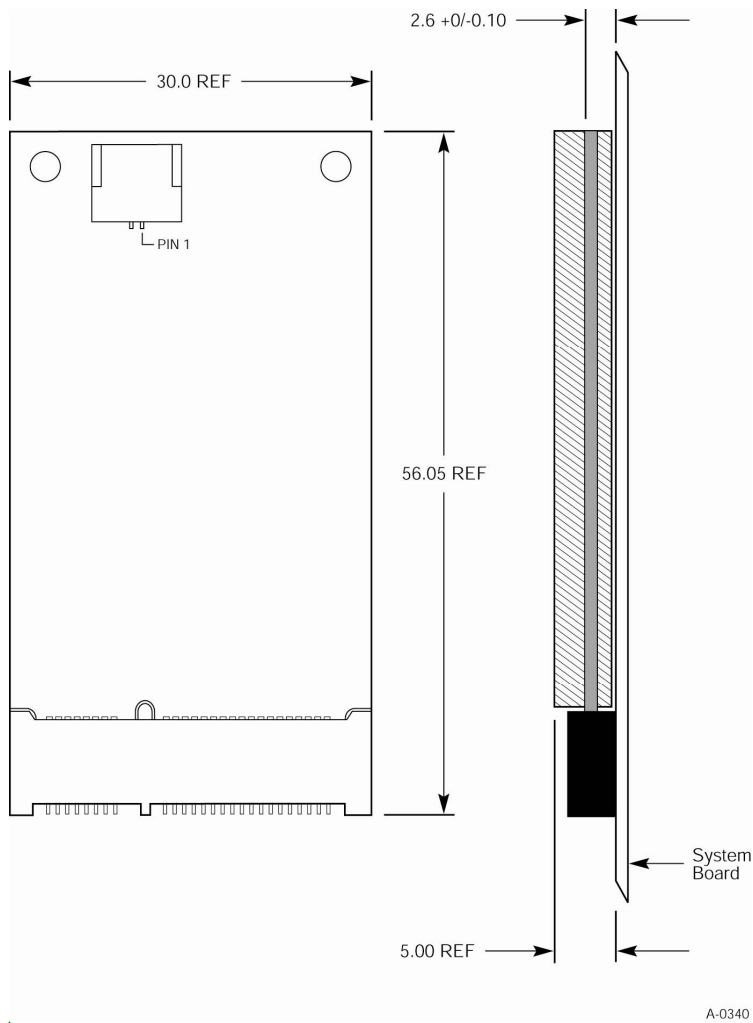


Figure 2-1: Full-Mini Card Form Factor (Modem Example Application Shown)

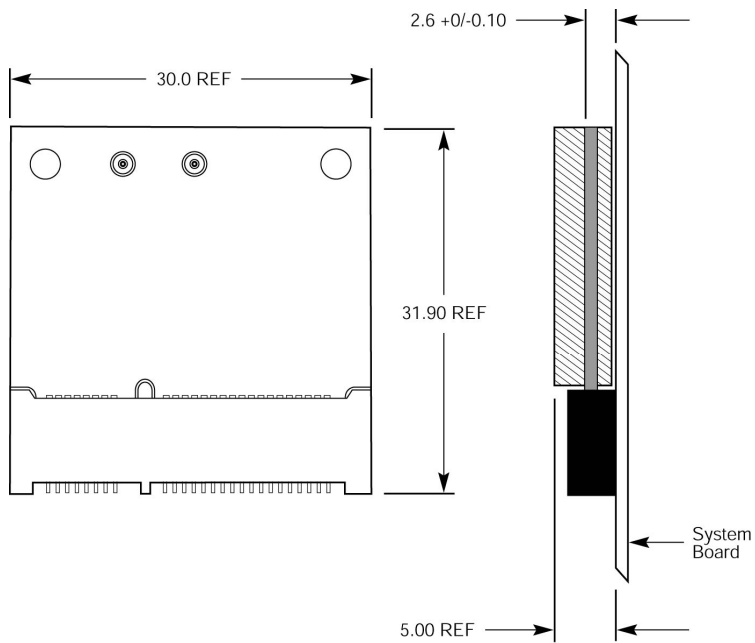
Deleted: is

Deleted: s

Deleted: a modem

Formatted: Font color: Black

Formatted: Normal



A-????

Figure 2-2: Half-Mini Card Form Factor (Wireless Example Application Shown)

Formatted: No page break before

2.2.2. Card PCB Details

Figure 2-3, [Figure 2-4](#), Figure 2-5, Figure 2-6, and Figure 2-7 provide the printed circuit board (PCB) details required to fabricate the card. The PCB for this application is expected to be 1.0 mm thick.

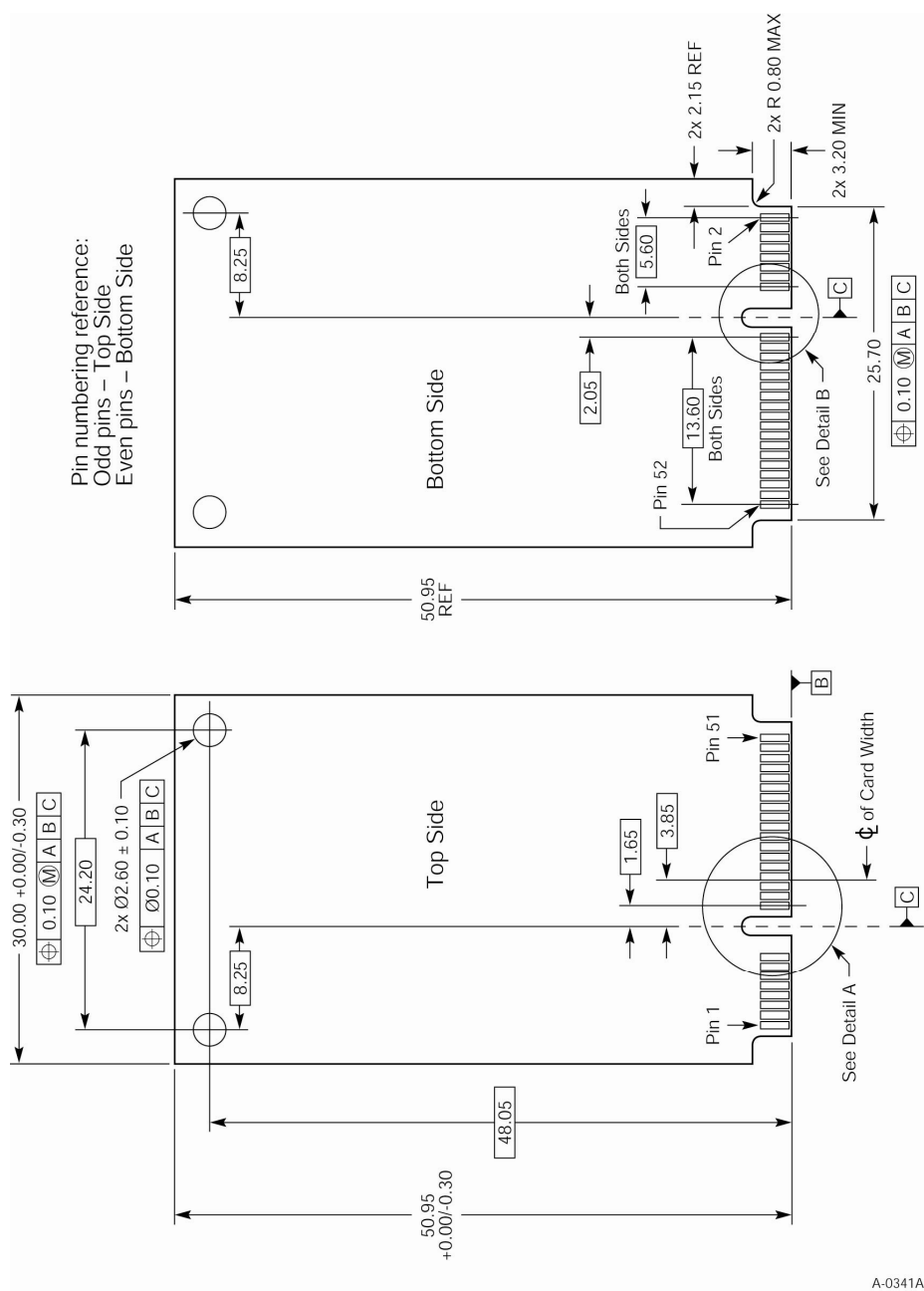


Figure 2-3: Full-Mini Card Top and Bottom

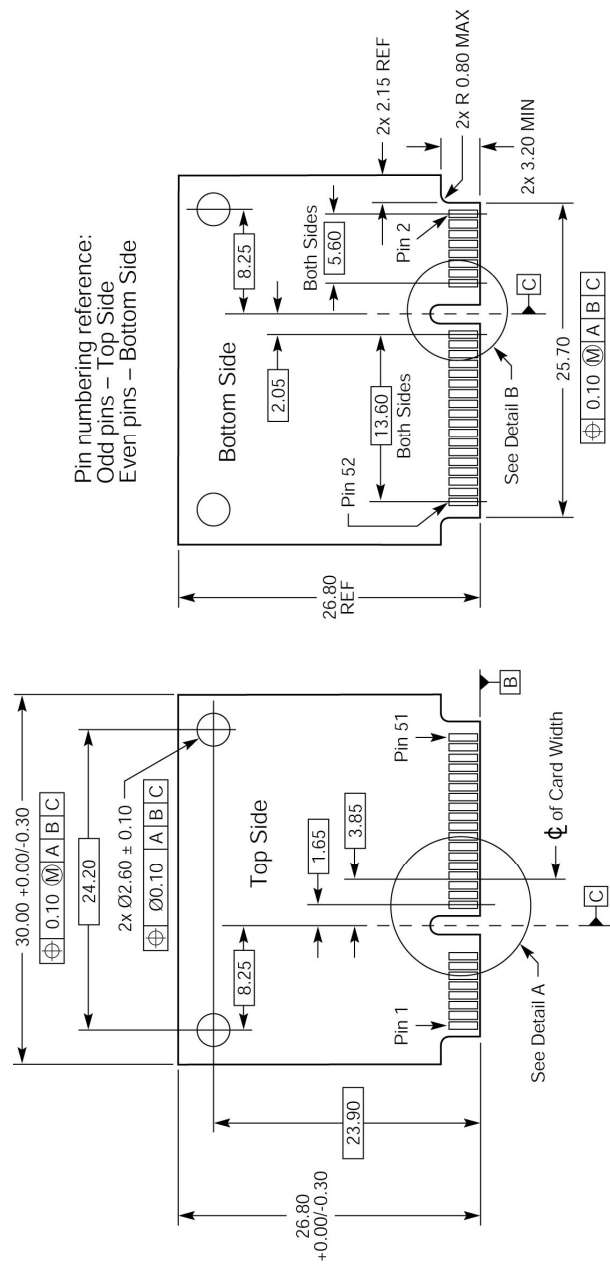
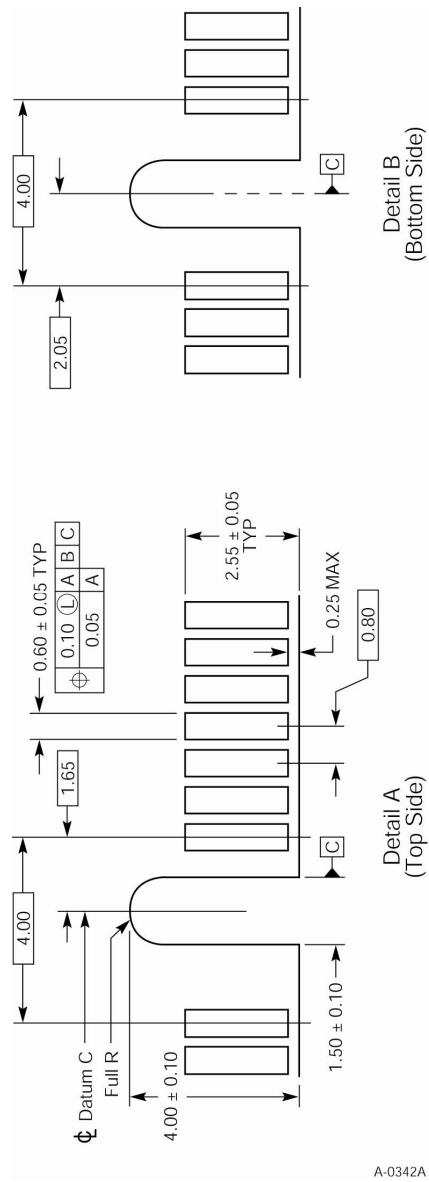


Figure 2-4: Half-Mini Card Top and Bottom



A-0342A

Figure 2-5: Card Top and Bottom Details A and B

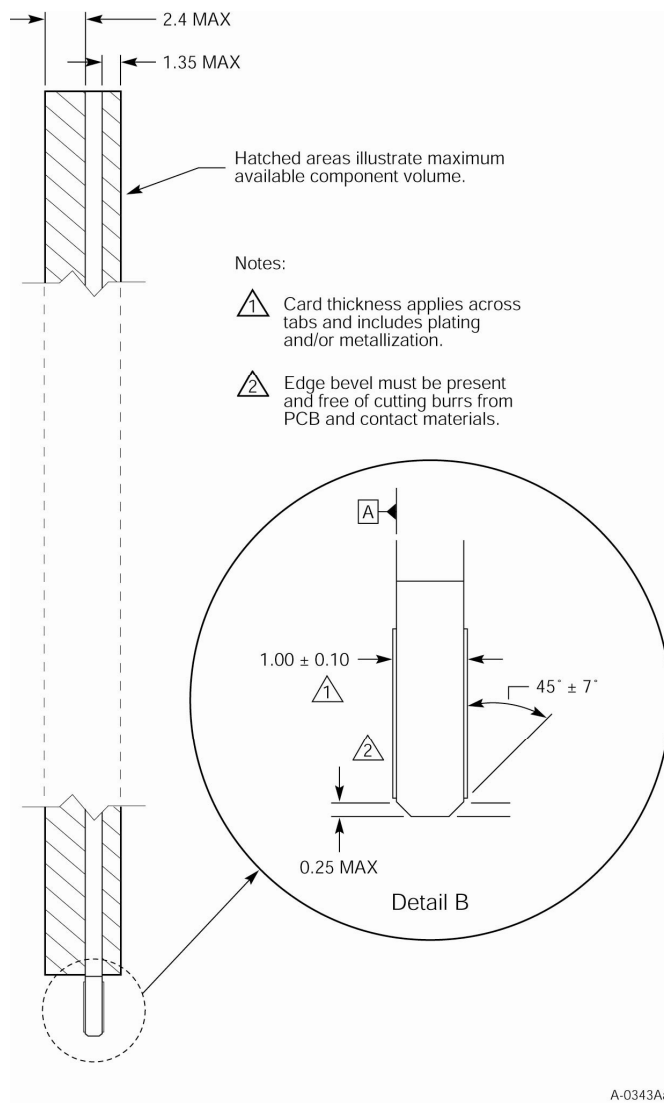


Figure 2-6: Card Edge

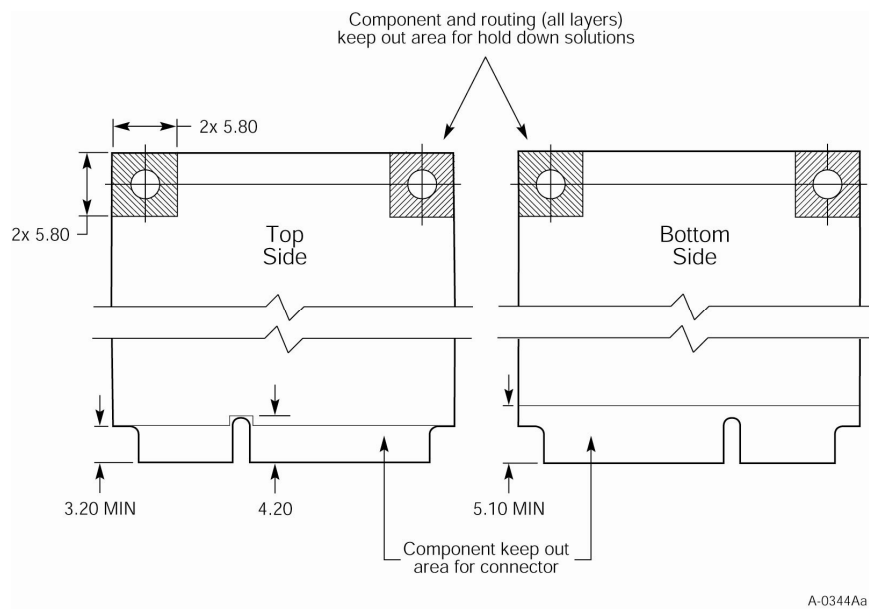


Figure 2-7: Card Component Keep Out Areas

Formatted: Font color: Black

Deleted: ¶

2.3. System Connector Specifications

The PCI Express Mini Card system connector is similar to the SO-DIMM connector and is modeled after the Mini PCI Type III connector without side retaining clips.

Note: All dimensions are in millimeters, unless otherwise specified. All dimension tolerances are ± 0.15 mm, unless otherwise specified.

2.3.1. System Connector

The system connector is 52-pin card edge type connector. Detailed dimensions should be obtained from the connector manufacturer. Figure 2-8 shows the system connector. Figure 2-9, [Figure 2-10](#), [Figure 2-11](#), and [Figure 2-12](#) show the recommended locations of the PCI Express Mini Card system connector on the system board.

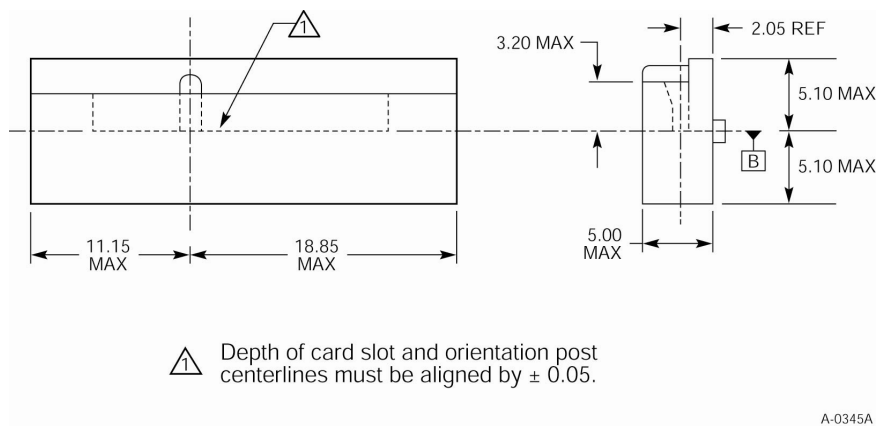
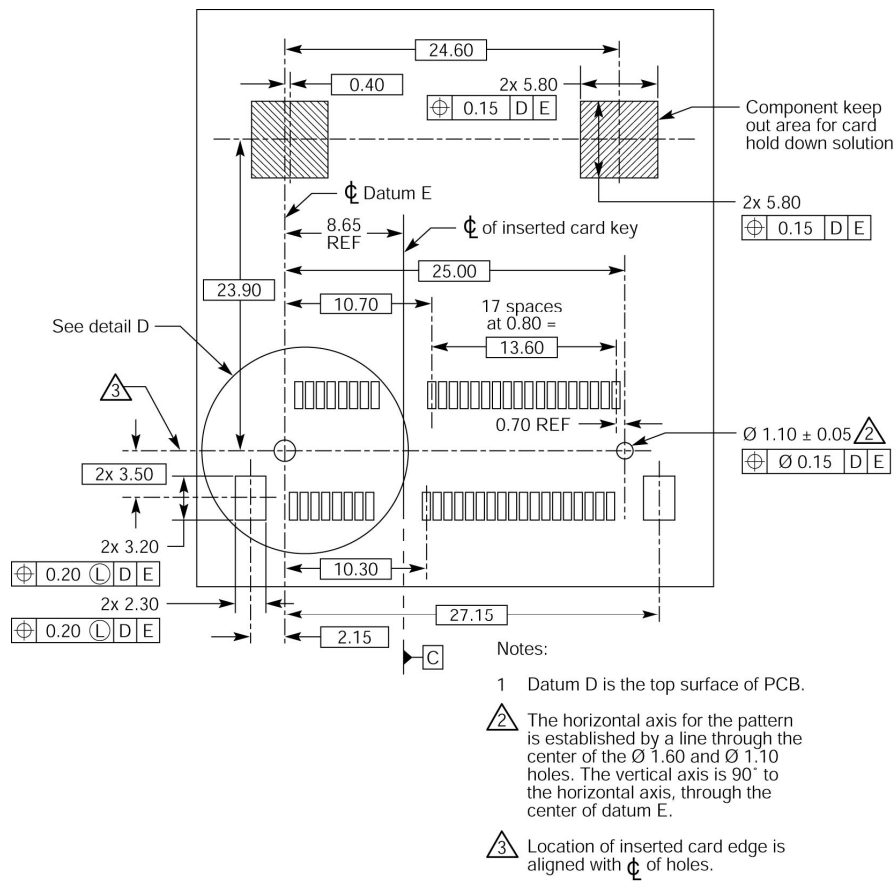


Figure 2-8: PCI Express Mini Card System Connector

Formatted: Normal, Centered, Keep with next



A-????

Figure 2-10: Recommended System Board Layout for Half-Mini Card (Single Socket)

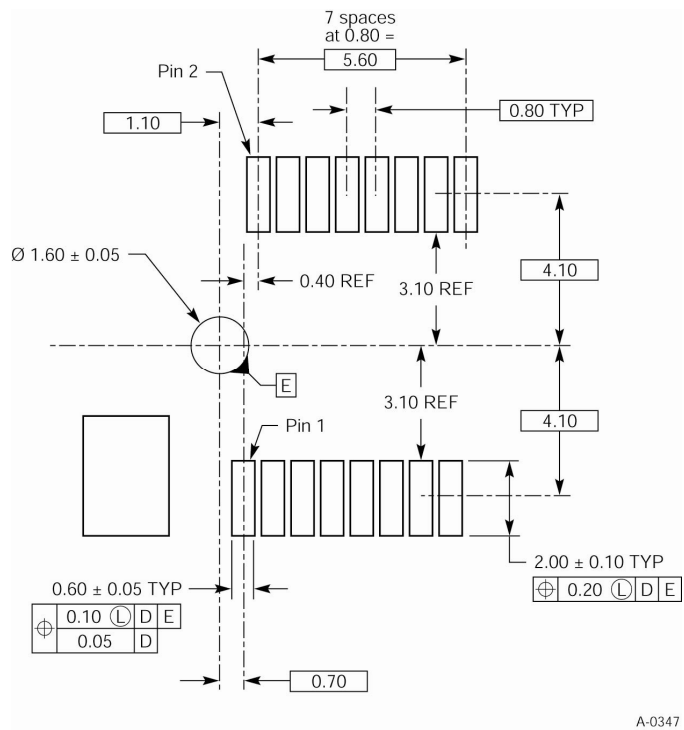


Figure 2-11: Recommended System Board Layout (Detail D)

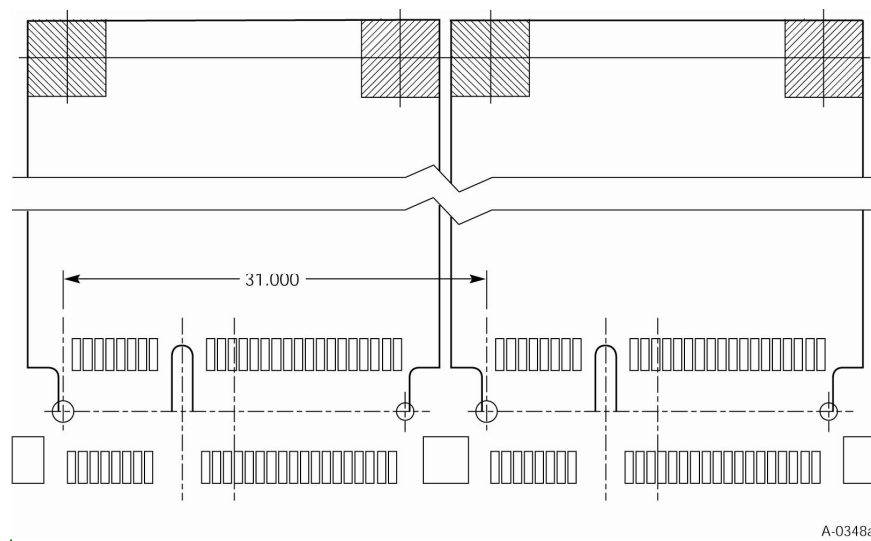


Figure 2-12: Recommended System Board Layout (Dual Socket)

Formatted: Font color: Black

Deleted: ¶

2.3.2. System Connector Parametric Specifications

Table 2-1, Table 2-2, Table 2-3, and Table 2-4 specify the requirements for physical, mechanical, electrical, and environmental performance for the system connector.

Table 2-1: System Connector Physical Requirements

Parameter	Specification
Connector Housing	U.L. rated 94-V-1 (minimum) Must be compatible with lead-free soldering process
Contacts: Receptacle	Copper alloy
Contact Finish: Receptacle	Must be compatible with lead-free soldering process

Table 2-2: System Connector Mechanical Performance Requirements

Parameter	Specification
Durability	EIA-364-9 50 cycles
Total mating/unmating force*	EIA-364-13 2.3 kgf maximum
Shock	EIA-364-27, Test condition A Add to EIA-364-1000 test group 3 with LLCR before vibration sequence. Note: Shock specifications assume that an effective card retention feature is used.

* Card mating/unmating sequence:

1. Insert the card at the angle specified by the manufacturer.
2. Rotate the card into position.
3. Reverse the installation sequence to unmate.

Table 2-3: System Connector Electrical Performance Requirements

Parameter	Specification
Low Level Contact Resistance	EIA-364-23 55 milliohms maximum (initial) per contact; 20 milliohms maximum change allowed
Insulation Resistance	EIA-364-21 > 5 x 10 ⁸ @ 500 V DC
Dielectric Withstanding Voltage	EIA-364-20 > 300 V AC (RMS) @ sea level
Current Rating	0.50 amp/power contact (continuous) The temperature rise above ambient shall not exceed 30 °C. The ambient condition is still air at 25 °C. EIA-364-70 method 2
Voltage Rating	50 V AC per contact

Table 2-4: System Connector Environmental Performance Requirements

Parameter	Specification
Operating Temperature	-40 °C to +80 °C
Environmental Test Methodology	EIA-364-1000.01 Test Group, 1, 2, 3, and 4
Useful field life	5 years

To ensure that the environmental tests measure the stability of the connector, the add-in cards used shall have edge finger tabs with a minimum plating thickness of 30 micro-inches of gold over 50 micro-inches of nickel (for environmental test purposes only). Furthermore, it is highly desirable that testing gives an indication of the stability of the connector when add-in cards at the lower and upper limit of the card thickness requirement are used. In any case, both the edge tab plating thickness and the card thickness shall be recorded in the environmental test report.

2.3.3. I/O Connector Area

The placement of I/O connectors on a PCI Express Mini Card add-in card is recommended to be at the end opposite of the system connector as shown in Figure 2-13. The recommended area applies to both sides of the card, though typical placement will be on the top of the card due to the additional height available. Depending on the application, one or more connectors may be required to provide for cabled access between the card and media interfaces such as LAN and modem line interfaces and/or RF antennas. This area is not restricted to I/O connectors only and can be used for circuitry if not needed for connectors.

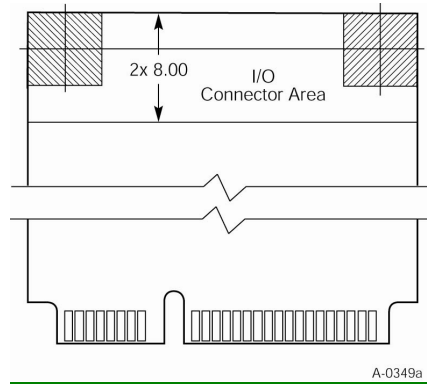


Figure 2-13: I/O Connector Location Areas

Formatted: Font color: Black